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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/724,231	11/28/2000	Krishna Balachandran	LUC-280/Balachandran 15-4	6529
32205	7590	01/30/2004	EXAMINER	
PATTI & BRILL ONE NORTH LASALLE STREET 44TH FLOOR CHICAGO, IL 60602			CHANG, EDITH M	
			ART UNIT	PAPER NUMBER
			2634	
DATE MAILED: 01/30/2004				

Please find below and/or attached an Office communication concerning this application or proceeding.

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<b>Office Action Summary</b>	Application No.	Applicant(s)
	09/724,231	BALACHANDRAN ET AL.
	Examiner	Art Unit
	Edith M Chang	2634

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

#### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

1) Responsive to communication(s) filed on 28 November 2000.

2a) This action is FINAL.                    2b) This action is non-final.

3) Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

4) Claim(s) 1-20 is/are pending in the application.

4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.

5) Claim(s) \_\_\_\_\_ is/are allowed.

6) Claim(s) 1-20 is/are rejected.

7) Claim(s) \_\_\_\_\_ is/are objected to.

8) Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

9) The specification is objected to by the Examiner.

10) The drawing(s) filed on \_\_\_\_\_ is/are: a) accepted or b) objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11) The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. §§ 119 and 120

12) Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a) All b) Some \* c) None of:

1. Certified copies of the priority documents have been received.

2. Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.

3. Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

13) Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application) since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

a) The translation of the foreign language provisional application has been received.

14) Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121 since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

#### Attachment(s)

1) Notice of References Cited (PTO-892)

2) Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) Information Disclosure Statement(s) (PTO-1449) Paper No(s) 2.

4) Interview Summary (PTO-413) Paper No(s) \_\_\_\_\_.

5) Notice of Informal Patent Application (PTO-152)

6) Other: \_\_\_\_\_.

## **DETAILED ACTION**

### ***Claim Objections***

1. Claims 1-12 are objected to because of the following informalities:

Claim 1, the term “comprising the steps of” is suggested to be changed to “comprising steps of”.

Claim 3, the term “comprising the step of deriving an error rate estimate” is suggested to be changed to “comprising a step of deriving an error rate estimate” for appearing in the claim first time.

Claim 5, the term “the step of deriving the soft decision metric” is suggested to be changed to “a step of deriving the soft decision metric”, for it appears in the claim first time.

Claim 8, the term “further comprising the step of employing the symbol or bit error probability to select” is suggested to be changed to “further comprising a step of employing the symbol or bit error probability to select”

Claim 11, the term “comprises the step of selecting” is suggested to be changed to “comprises a step of selecting”.

Claim 12, the term “comprises the step of comparing the symbol error probability to one or more predetermined thresholds” is suggested to be changed to “comprises a step of comparing the symbol error probability to one or more predetermined thresholds”.

Appropriate corrections are required.

***Claim Rejections - 35 USC § 112***

2. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

Claims 15, 16, 18, 19, and 20 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

Claim 15, the term “a selector circuit” is not taught in the specification to describe the structure of the selector circuit, the function of the selector circuit, and how does the selector circuit that changes a communication protocol in response to the error rate estimate, to convey the invention.

Claim 16, the term “a selector circuit” is not taught in the specification to describe the structure of the selector circuit, the function of the selector circuit, and how does the selector circuit that changes one or more of a modulation and coding scheme in response to the error rate estimate.

Claim 18, the term “a variant” in “or a variant” is not taught in the specification to describe “a variant” of what, and how does the decision device perform demodulation through a variant, to convey the invention.

Claim 19, the term “variants” in “or variants” is not taught in the specification to describe “variants” of what, and how does the decision device perform equalization through variants, to convey the invention.

Claim 20, the term “article” is not taught in the specification to describe that what is the “article”, and what does it contain.

3. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claim 9 recites the limitation “the transmitter” in “at the transmitter”. There is insufficient antecedent basis for this limitation “the transmitter” in the claim or its parent claim.

#### ***Claim Rejections - 35 USC § 102***

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

5. Claims 1-5, 7-15, 17-20 are rejected under 35 U.S.C. 102(e) as being anticipated by Servais et al. (US 6141388).

Regarding **claim 1**, Servais et al. discloses all subject matter claimed, a method comprising the steps of: determining a soft decision metric at a receiver for a plurality of symbols transmitted over a communication channel (VITERBI ALGORITHM FIG.3, column 1 lines 50-60, column 3 lines 45-50, where the soft decision metric at a receiver for a plurality of symbols); and employing the soft decision metric to determine symbol or bit error probability (104-106 FIG.7, column 4 lines 20-27, where the mean error rate estimate as the moving average of error probability).

Regarding **claim 2**, Servais et al. discloses observing the output of the communication channel (COMMUNICATION CHANNEL-DEMODULATION/EQUALIZATION FIG.3, where the observation is performed); and determining a derived probability for each one of the plurality of transmitted symbols through employment of a set of observations at the output of the communication channel (DEMODULATION/EQUALIZATION-CONVOLUTIONAL DECODING (VITERBI ALGORITHM FIG.3, 102-104 FIG.7, where deriving probability through employment of a set of observations at the output of the communication channel is performed).

Regarding **claim 3**, Servais et al. discloses deriving an error rate estimate as a moving average of the symbol or bit error probability (104-106 FIG.7, column 4 lines 20-27, where the mean error rate estimate as the moving average of error probability).

Regarding **claim 4**, Servais et al. discloses the error rate estimate in providing feedback to a transmitter (column 4 lines 40-48, where the error rate estimate feeds back via control node to the transmitter to adjust the power or the strength of the FEC, column 6 lines 41-45 where the feedback is provided).

Regarding **claim 5**, Servais et al. discloses deriving the soft decision metric from an output of at least one of an equalizer and a demodulator (DEMODULATION/EQUALIZATION-CONVOLUTIONAL DECODING (VITERBI ALGORITHM FIG.3, 102-104 FIG.7, where the soft decision metric from an output of at least one of an equalizer and a demodulator).

Regarding **claim 7**, Servais et al. discloses the transmitted symbols comprising binary values (column 1 lines 30-39).

Regarding **claims 8 & 9**, Servais et al. discloses employing the error probability to select a communication protocol at the transmitter (column 4 lines 40-50, where the transmitter adjusts the power of the transmitted signal or the strength of a FEC).

Regarding **claim 10**, Servais et al. discloses employing the error probability to select a communication protocol is performed at the receiver (column 6 lines 41-55, it performs at the receiver as well, the receiver can be the receiver of the mobile terminal or the receiver of the base station).

Regarding **claim 11**, Servais et al. discloses selecting at least one of a modulation scheme, a coding scheme, symbol rate, and power level (column 4 lines 40-50, the power level or the strength of a FEC).

Regarding **claim 12**, Servais et al. discloses comparing the error probability to one or more predetermined thresholds (column 3 lines 52-58).

Regarding **claim 13**, Servais et al. discloses a system (FIG.2) comprising: a transmitter that transmits a plurality of symbols over a communication channel (26 FIG.2, TRANSMITTER FIG.3); a receiver that receives a plurality of symbols over the communication channel (22 FIG.2, RECEIVER FIG.3); a decision device that provides a plurality of soft decision metrics (44-

50 FIG.2, DEMODULATION/EQUALIZATION-CONVOLUTINAL DECODING FIG.3); a processor that obtains an error rate estimate (49 FIG.2, CALCULATE ACTUAL CHANNEL BER-MAP VITERBI METRIC TO BER FIG.3) from the soft decision metrics.

Regarding **claim 14**, Servais et al. discloses a feedback link that communicates an error rate estimate from the receiver to the transmitter (22-30-26-28-26-30 FIG.1 is the feedback link, column 4 lines 40-48, column 6 lines 38-55).

Regarding **claim 15**, Servais et al. discloses a selector circuit that changes a communication protocol in response to the error rate estimate (28/22/26 FIG.1 is one selector circuit that changes a communication protocol in response to the error rate estimate, column 4 lines 40-48, column 6 lines 38-55, where the base station, mobile terminal, or MTSO/control node can be the selector circuit).

Regarding **claim 17**, Servais et al. discloses the decision device comprising one or more of a demodulator and an equalizer (DEMODULATION/EQUALIZATION FIG.3).

Regarding **claim 18**, Servais et al. discloses the decision device performing demodulation through employment of a Viterbi decoder algorithm or a variant (DEMODULATION/EQUALIZATION-CONVOLUTINAL DECODING FIG.3).

Regarding **claim 19**, Servais et al. discloses the decision device performing equalization through employment of one or more of a BCJR algorithm, a soft output Viterbi algorithm, or variants (EQUALIZATION-CONVOLUTINAL DECODING (VITERBI ALGORITHM) FIG.3).

Regarding **claim 20**, Servais et al. discloses an article (FIG.2/FIG.7), comprising: a computer-readable signal-bearing medium (49 FIG.2); means for determining a soft decision metric at a receiver (46 FIG.2, 104 FIG.7); and means for employing the soft decision metric to determine symbol or bit error probability (50 FIG.2).

***Claim Rejections - 35 USC § 103***

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

7. Claim 6 is rejected under 35 U.S.C. 103(a) as being unpatentable over Servais et al. (US 6141388) in view of Khayrallah et al. (US 6597743 B1).

Regarding **claim 6**, Servais et al. does not explicitly specify a log likelihood ratio, however Khayrallah et al. teaches a log likelihood ratio (108 FIG.4, column 5 lines 42-55). At the time of the invention, it would have been obvious to a person of ordinary skill in the art to use the log likelihood ration taught by Khayrallah et al. in Servais et al.'s determining the soft decision metric to have a reduced search symbol estimation algorithm (Abstract, column 1 lines 5-10).

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8. Claim 16 is rejected under 35 U.S.C. 103(a) as being unpatentable over Servais et al. (US 6141388) in view of Trompower et al. (US 5950124).

Regarding claim 16, Servais et al. does not explicitly specify the modulation and coding scheme, however Trompower et al. teaches changing one or more modulation and coding scheme in response to the error rate estimate (Abstract, column 5 lines 40-52, where the PN code length and the chipping rate is the coding scheme). At the time of the invention, it would have been obvious to a person of ordinary skill in the art to change one or more of the modulation and coding scheme in response to the error rate taught by Trompower et al. in Servais et al.'s system to improve data transmission rate to enhance system performance (column 5 lines 23-30).

### *Conclusion*

9. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Edith M Chang whose telephone number is 703-305-3416. The examiner can normally be reached on M-F.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Stephen Chin can be reached on 703-305-4714. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9314.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-305-4800.

Edith Chang  
January 23, 2004

*Chieh M. Fan*  
CHIEH M. FAN  
PRIMARY EXAMINER